



Washington State

Federal Hatchery Reform Program

Overview and Status Report Federal 2000 Funds

FEBRUARY 2001

Hatchery Scientific Review Group

Mission Statement:

To conserve indigenous genetic resources, assist with the recovery of naturally spawning populations, provide for sustainable fisheries, conduct scientific research, and improve the quality and cost-effectiveness of hatchery programs.

HATCHERY SCIENTIFIC REVIEW GROUP

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Hatchery Reform Program: Background

There are approximately 100 hatchery facilities in Puget Sound and Coastal Washington, operated by the Washington State Department of Fish and Wildlife (WDFW), Puget Sound and Coastal Indian Tribes, and the US Fish and Wildlife Service (USFWS). Most were built to produce fish for harvest, compensating for declines in wild salmon populations. Hatcheries play an important role in the North Pacific sports and commercial fishing economy and in meeting tribal treaty harvest obligations. However, they have also been identified as one of the limiting factors responsible for the depletion of wild salmon stocks.

U.S. Congress - Creation of the Hatchery Reform Program

In May 1999, a group of leading scientists presented its recommendations to the U.S. Congress in a report entitled *The Reform of Salmon and Steelhead Hatcheries in Puget Sound and Coastal Washington to Recover Natural Stocks While Providing Fisheries*. The report determined that the potential exists for hatcheries to have a major positive impact on the recovery of wild salmon, in just a few years and at relatively small costs. The team called for a comprehensive hatchery reform effort led by a panel of independent scientists to conserve indigenous genetic resources; assist with the recovery of naturally spawning populations; providing for sustainable fisheries; conduct scientific research; and improve the quality and costs-effectiveness of hatchery programs.

With the support of Senator Slade Gordon (R-WA), Senator Patty Murray (D-WA), Congressman Norm Dicks (D-WA), and Washington Governor Gary Locke, the US Congress adopted and funded the recommendations in federal fiscal year 2000, launching the Puget Sound and Coastal Washington Hatchery Reform Program. The program is a systematic, science-driven redesign of how hatcheries will be used to achieve new purposes: 1) helping to recover and conserve naturally spawning salmonid populations and 2) supporting sustainable fisheries.

Hatchery Scientific Review Group

What is the “Scientific Review Group”? The Hatchery Scientific Review Group (HSRG) is the independent scientific panel established by Congress to ensure that hatchery reform programs in Puget Sound and Coastal Washington are scientifically founded and evaluated; that independent scientists coordinate with agency and tribal scientists to provide direction and operational guidelines; and that the system as a whole is evaluated for compliance with scientific recommendations. The objective of the Scientific Review Group is to assemble, organize, and apply the best available scientific information in order to provide guidance to policy makers implementing hatchery reform.

Who is on the Scientific Review Group? The Scientific Review Group is composed of five independent scientist (selected from a pool of candidates nominated by the American Fisheries Society) and four agency scientists from the Washington Department of Fish and Wildlife (WDFW), the Northwest Indian Fisheries Commission (NWIFC), National Marine Fisheries Service (NMFS), and US Fish and Wildlife Service (USFWS). Like the independent scientists, the agency scientists are responsible for evaluating scientific merits and do not represent agency policies. The nine scientists serving on the Scientific Review Group have a broad range of experience. Their scientific disciplines range from biology, genetics, ecology, fisheries, fish culture, fish pathology, biometrics and other disciplines. HSRG’s members names and organizations are included on the front cover.

Work To Date: The Hatchery Scientific Review Group convened in March 2000. In December 2000, the HSRG completed its *Scientific Framework for Artificial Propagation of Salmon and Steelhead* Report. The objective of this document is to organize the best available scientific information about hatcheries in Puget Sound and Coastal Washington for the purposes of repositioning hatcheries and implementing hatchery reform. The scientific framework will allow the Scientific Group to form and test the hypotheses that will guide research, communicate with other scientists, decision-makers and the public and create a repository of knowledge upon which to base advice to the co-managers. The test for the effectiveness of this scientific framework will be its usefulness to decision-makers. The *Scientific Framework* is intended to be a “living” document and will be revised periodically, as new information becomes available.

2000 Funding

For federal fiscal 2000, Congress appropriated \$3.3 million to the US Fish & Wildlife Service (USFWS) to initiate the Hatchery Reform program. Congress directed the funds to be administered and disbursed through the office of the Washington State Interagency Committee for Outdoor Recreation (IAC).

The Hatchery Scientific Review Group served as program advisor. Under its guidance, the state obtained approval from USFWS to expend the funds in six categories:

1. Hatchery Scientific Review Group operations - (*\$279,343*)
2. Improvement of Hatchery Management Practices, including hatchery management and monitoring plans - (*\$1,350,000*)
3. Evaluation and Monitoring – (*\$600,000*)
4. Scientific Research Grants
 - Experiment design & testing - (*\$200,000*)
 - Research projects - (*\$519,977*)
5. Long Live the Kings (LLTK) – facilitation and coordination - (*\$340,000*)
6. Office of the Interagency Committee for Outdoor Recreation (IAC) – administration and fiscal operations – (*\$47,000*)

A detailed description of each of these categories and the activities supported follows.

2001 Funding

Congress appropriated \$4.7 million to continue the Hatchery Reform Program. The Hatchery Scientific Review Group is in the process of awarding additional scientific grants. Awards are anticipated in late Spring 2001. The IAC Office is again providing business office administration for the Program.

Hatchery Reform 2000 Scientific Research Grants Index

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Fish & Wildlife Dept. of **\$49,260** **\$53,374** **\$102,634**
Selective Removal of Adult Hatchery Fish From Commingled Wild Stocks

Design & Purpose: WDFW is testing three commercial live capture fishing gear methods to remove adult hatchery salmon from commingled wild salmonid stocks at the Naselle River in Pacific County. Successfully removing hatchery fish will reduce negative ecological interactions between hatchery and wild fish. The study will also enable commercial fishers to evaluate the impacts of selective commercial fishing gear on salmon. It is anticipated that this information will also be useful in other areas where hatchery fish are mingled with wild salmon stocks. (01-043)

Status as of Jan. 2001: Two of the three different fishing gear methods have been built and are being tested. The fishing gear designed for use at the Naselle Hatchery was inadequate. Staff are exploring new designs and anticipate installation by June 2001. Comparison of results of each different fishing gear method will occur after the third method is installed and tested. As fish return to the Naselle Hatchery, Dept. of Fish and Wildlife staff will evaluate the characteristics of returning hatchery Coho salmon.

Fish & Wildlife Dept. of **\$19,092** **\$20,150** **\$39,242**
Using Semi-natural Rearing Habitat To Improve Smolt-to-Adult Survival of Chinook Salmon

Design & Purpose: This project will test the hypothesis that the addition of artificial structures to a large rearing pond will increase the smolt-to-adult survival of Chinook salmon. The study is occurring at Clear Creek Hatchery on the Nisqually River in Pierce County. Floating and bottom structures will be installed into a large chinook salmon rearing pond, while a separate pond will be used as a control. Growth and health of fish reared in each pond will be compared to determine whether the structures provide a benefit to the fish. If the addition of artificial structures in rearing ponds is determined to improve fish survival rates, this technique can be applied by the Nisqually Tribe to help recover wild Chinook salmon. The Nisqually Tribe is an active partner on this project. (01-044)

Status as of Jan. 2001: WDFW staff and the Nisqually Tribe are currently in the process of designing and constructing the floating and bottom structures for installation at the Clear Creek Hatchery rearing pond. The structures are being designed to provide shade, underwater structural diversity, and cover for fish, and will be installed in time for fish rearing.

Fish & Wildlife Dept. of	\$119,578	\$23,162	\$142,740
Differences in Natural Production Between Hatchery and Wild Coho Salmon			

Design & Purpose: WDFW is studying the differences in reproductive competence between hatchery and wild fish at Minter Creek Hatchery in South Puget Sound. The results of the study will help increase understanding about the differences between hatchery and wild salmon reproduction, and will be useful for managing large hatchery programs to minimize conflicts with natural fish production in the same watershed. Project partners include the Northwest Indian Fisheries Commission and the National Marine Fisheries Service. (01-045)

Status as of Jan. 2001: To track fish spawning at Minter Creek, the existing barrier at Minter Creek Hatchery needed to be modified to control salmon access to the Minter Creek spawning grounds. To this end, a modification structure was designed, permitted, and installed over July and August, 2000. Protocols were developed to measure fecundity (egg production) of returning hatchery and wild Coho salmon. Fish are now being intercepted, studied, and tagged before releasing them back into the creek. January through April 2001 will be used to evaluate fish samples to complete the study.

Fish & Wildlife Dept. of	\$12,045	\$3,614	\$15,659
Impacts of Size Selective Gillnet Fisheries On Puget Sound Coho Salmon Populations			

Design & Purpose: The purpose of this project is to document historical trends in salmon size selectivity at terminal gillnet fisheries in Puget Sound and the Washington Coast. This information will be used to determine over time the rates of decline in salmon body size and fecundity (egg production) of Coho salmon populations. The study results will also be used to determine demographic and genetic impacts to salmon populations of fishery practices that are based on salmon size. (01-047)

Status as of Jan. 2001: WDFW has examined gillnet fisheries data for the project area from 1980 to 1994, specifically tracking salmon size and fecundity. Temporal trends were estimated using this data for the years 1940-1995 and 1960-1995. These estimates are being used to determine whether salmon populations experienced significant size selection, and whether there is a significant difference between rates of population decline and gillnet size selectivity and fishing intensity. Remaining tasks include a literature review and report drafting summarizing findings.

Fish & Wildlife Dept. of	\$10,000	\$26,208	\$36,208
Comparing Success of Three Fish Culture Strategies to Recover Snow Creek Coho Salmon			

Design & Purpose: For several years, WDFW and local volunteer groups in Jefferson County have been working together to recover dwindling Coho salmon stocks in Snow Creek. Their efforts focus on capturing returning adult Coho, artificially spawning the fish, incubating their eggs at the Hurd Creek Hatchery, and releasing the hatchery-reared fish at several locations in the watershed. The purpose of this project is to determine whether salmon size, fecundity (egg production), egg size, out-migration timing, and other factors differ due to pre-release conditions. The study will provide important information to help refine Coho recovery efforts throughout Puget Sound and the Washington Coast. (01-046)

Status as of Jan. 2001: WDFW staff have collected adult Coho at Snow Creek, incubated eggs, and reared fish, releasing them at Crocker Lake in the fall and winter. Two additional fish releases occurred in fall and winter 2000. WDFW staff also captured, counted, measured, and identified the origins of Coho salmon smolts produced from adult Coho captured at Snow Creek in 1998. Data collected to date is being analyzed to determine whether location and conditions of fish release have an impact on returning salmon size, fecundity, and other factors. Preliminary data indicate that pre-release treatment of fish may have a subtle effect on smolt size, but it is too early to tell whether other parameters are being affected.

Makah Tribal Council	\$22,000	\$12,842	\$34,842
Characterization of Lake Ozette Sockeye Salmon for Enhancement Recovery Strategies Using Genetic Marks			

Design & Purpose: The Makah staff will collect baseline genetic and demographic information to test whether sockeye salmon can be successfully reintroduced into tributaries of Lake Ozette in Clallam County, where they are extinct. The study will also assess whether supplementation is a viable means of rebuilding the distribution and abundance of beach-spawning sockeye salmon. A variety of genetic data as well as otolith markings (from a tiny, bone like particle in the internal ear of many vertebrates) will be collected, and will be useful to fisheries managers in developing effective strategies to monitor abundance, distribution, and interactions among wild and hatchery fish populations. Project results will be incorporated into the recovery plan for Lake Ozette sockeye salmon, as well as the Hatchery Genetic Management Plan. (01-038)

Status as of Jan. 2001: Makah staff is collecting Lake Ozette sockeye salmon samples (including archived samples from various sources). The sponsor subcontracted with Washington Department of Fish and Wildlife to genotype collected samples using micro-satellite DNA techniques. Genotype analysis will be conducted through the summer of 2001, and a final report will be completed in the fall.

University of Idaho	\$48,301	\$20,290	\$68,591
Aquaculture Research Center			
Development of Engineered Streams for Salmon Production			

Design & Purpose: The University of Idaho Aquaculture Research Center is working cooperatively with Washington Dept. of Fish and Wildlife (WDFW) and Washington State University to design, develop, and install an engineered stream system to supplement hatchery production of wild salmonids in Washington. Project staff will install the engineered stream at Hatchery Creek, behind the WDFW hatchery on the Dungeness River in Clallam County. This demonstration project is testing the viability of using engineered streams for wild Coho salmon production. The engineered stream will be designed to meet biological criteria of Coho salmon. It is anticipated that this strategy will be useful in the future to either replace or supplement hatchery production. (01-039)

Status as of Jan. 2001: Construction of the engineered stream on Hatchery Creek is 95% complete. The channel is approximately 300 feet long, six feet wide, and almost three feet deep. A water diversion screen has been installed to route water into the stream, and another screen was installed to control the movement of juvenile salmonids into and out of the channel. Over the next few months, peak water flow events will aid in the formation of high quality juvenile salmonid habitat in the engineered stream. Salmon eggs will be planted in the channel in February or March, and fish densities will be monitored and documented throughout spring, summer, and fall.

University of Washington	\$24,000	\$34,422	\$58,422
Interactions Between Wild And Hatchery Steelhead: Evaluating Key Assumptions			

Design & Purpose: To prevent negative interactions with wild fish, Washington hatchery-reared steelhead are bred to return early in the year. The recent establishment of a hatchery steelhead run on Forks Creek, in the Willapa River watershed of Pacific County, provides an opportunity to study whether this approach is indeed working. University of Washington staff, with support from the Weyerhaeuser Foundation and cooperation from Long Live the Kings, will sample hatchery and naturally-produced steelhead at various life stages. Samples will be analyzed to determine relative production and survival of wild, hatchery, and naturally-spawning hatchery-origin steelhead, as well as the extent of interbreeding between groups. Results will help determine whether early return of hatchery steelhead effectively minimizes negative impacts on wild salmon. (01-037)

Status as of Jan. 2001: Project staff sampled adult steelhead returning to Forks Creek during the 1999 season and recorded length, weight, egg size, fecundity (egg production), and genetic information. Staff also sampled hatchery pre-smolts and wild smolts, recording similar data. Wild juvenile sampling occurred in the fall of 2000. Analysis will take place once all the sampling is completed.

Fish & Wildlife Dept. of	\$12,844	\$154,368	\$167,212
White River Acclimation Pond Evaluation			

Design & Purpose: This project will evaluate spring Chinook salmon smolt-to-adult survival rates in the upper White River of the Puyallup River watershed in King/Pierce Counties for smolts released from three up-river acclimation sites (Huckleberry Creek, Cripple Creek, and Clearwater River). This project will use fish body tagging to monitor survival rates and determine whether natural spring Chinook salmon supplementation efforts are effective. The South Sound Spring Chinook Technical Committee is a partner on this project. Fish & Wildlife staff will tag a total of 400,000 chinook fry at Hupp Springs and White River hatcheries prior to their transfer to the acclimation sites. Information from this study will be useful in determining whether alternatives need to be developed to increase natural spring Chinook salmon spawning in the Puyallup watershed. (01-036)

Status as of Jan. 2001: Fish & Wildlife staff test-tagged Minter Creek hatchery fall Chinook salmon to ensure the success of the body tagging effort in the White River. Several tagging methods showed with limited success or significant fry mortality. It was determined that a ventral fin clip would be an appropriate tagging alternative. After resolving the tagging problems, the project proceeded as planned with tagging and transfer of Hupp Springs and White River hatchery fry to acclimation sites. Salmon fingerlings were released in June, 2000. Remaining work includes evaluation of survival and spawning distribution from May through October of 2001 through 2004.

Fish & Wildlife Dept. of	\$42,541	\$28,263	\$70,804
National Marine Fisheries Service	\$49,400	\$102,067	\$151,467
Development of Field Methods to Determine Effect of Hatchery Release Methods on Interactions Between Hatchery and Wild Juvenile Salmonids			

Design & Purpose: The purpose of this project is to develop a cost-effective method to evaluate the effects of various hatchery release methods on juvenile wild salmon abundance, behavior, habitat use, growth, and condition. Several evaluation methods will be tested and data will be collected at various upstream and downstream hatchery release sites on rivers throughout the Washington Coast, including sites on the Willapa, Bogachiel, Humptulips, Willapa, Naselle, and Nemah Rivers. National Marine Fisheries Services (NMFS) staff will compare data from various methods to determine which method best assesses the degree to which wild salmonids are affected by hatchery releases. The method developed could potentially be used to evaluate hatchery releases in a variety of streams throughout the Washington Coast. (01-041)

Status as of Jan. 2001: NMFS staff used underwater observations to estimate the number of wild salmonids at various sites before and after hatchery release. Observations included upstream (control) and downstream sites. At two sites on the Nemah River, fish fry density were also estimated using electrofishing. This information will be used to determine the accuracy of underwater observations. Divers also observed wild Coho fry habitat use, feeding behavior, and growth and physiology. This data is currently being analyzed, and a draft report should be completed by early 2001.

National Marine Fisheries Service \$34,000 \$58,562 \$92,562
Evaluation of Conservation Hatchery Rearing and Release Strategies for Steelhead Recovery in the Hamma Hamma River

Design & Purpose: Funding for this project supports a cooperative research effort to evaluate the effectiveness of steelhead supplementation in the Hamma Hamma River in Mason County. Project partners, including Hood Canal Salmon Enhancement Group, Long Live the Kings, Washington Dept. of Fish & Wildlife, and the Point No Point Treaty Council will compare changes in steelhead abundance over time in the Hamma Hamma River to data from other Hood Canal rivers. Study results will be used to determine whether certain conservation hatchery practices are effective, and will contribute to an overall understanding of using artificial propagation for conservation purposes. (01-042)

Status as of Jan. 2001: Project partners have collected data from the Hamma Hamma River on salmon spawning and use, and are using a comprehensive Risk Assessment approach to determine population diversity, loss in genetic variation, negative interactions among salmon, loss due to hatchery failure, domestication, and negative effects associated with reduction in breeders. The Risk Assessment is currently underway, and project partners are evaluating results, which will be summarized in a draft report.

National Marine Fisheries Service \$76,916 \$75,115 \$152,031
Increase Post-Release Survival By Rearing Coho Salmon With NATURES (Semi-natural Raceway Habitat)

Design & Purpose: Studies have repeatedly demonstrated that rearing Chinook salmon in NATURES, a type of semi-natural raceway habitat, increases their instream survival. NATURES raceways are created with gravel pavers, fir tree instream structures, and camouflage netting for overhead cover. This project is a cooperative effort between NMFS and Washington Dept. of Fish & Wildlife to evaluate whether use of NATURES raceway habitat for rearing also increases the number of Coho salmon recruiting to the fishery and spawning population. Research will be conducted with salmon grown in standard concrete raceways at various Puget Sound hatcheries. At each hatchery, there will be control and NATURES-type semi-natural raceway habitats. Salmon will be reared in the raceways for at least 90 days before release, and staff will routinely monitor and compare fish growth, color development and health. The study will test the hypothesis that NATURES habitat is beneficial for salmon recovery, and can be successfully employed to enhance mitigation and salmon enhancement programs. (01-040)

Status as of Jan. 2001: Project scientists have selected raceway sites for the study, including the Issaquah hatchery and hatcheries on Kendall Creek, Soos Creek, and Minter Creek. They worked with manufacturers in June of 2000 to develop several types of concrete pavers that can be installed in NATURES raceways. The pavers were tested in August, and appeared to be suitable for use in the NATURES raceways, which are under construction. Fish will be tagged after raceway construction, and released and monitored over the first half of 2001. Data will be collected, analyzed and summarized in a draft report in May of 2001.

2000 HSRG Programmatic Activities Support

1. **Hatchery Scientific Review Group** - provides direction and oversight to the hatchery scientific research grant program. Will produce guidelines for hatchery management, identify scientific needs, and make recommendations for further study. *(\$279,343)*
2. **Improvement of Hatchery Management Practices** - the Department of Fish and Wildlife and the Northwest Indian Fisheries Commission were given funds to augment fisheries, protect genetic resources, avoid negative ecological interactions between wild and hatchery fish, promote the recovery of naturally spawning populations, employ new rearing protocols to improve survival and to develop operational efficiencies. They will identify hatchery modifications and develop management and monitoring plans at each tribal facility and the state-supported hatcheries in Puget Sound and coastal Washington. *(\$1,350,000)*
3. **Evaluation and Monitoring** – the Department of Fish and Wildlife and the Northwest Indian Fisheries Commission were provided funds to establish a team of scientists with responsibility for generating and maintaining data bases, analyzing existing data developing technical support infrastructures and establishing a science-based decision making process. They will evaluate the contribution of hatchery fish to impacts on wild stocks and net values resulting from hatchery operations, and to implement hatchery management and monitoring plans identified in #2 above. *(\$600,000)*
4. **Scientific Research Grants** –
 - a. the Department of Fish and Wildlife and the Northwest Indian Fisheries Commission will test hatchery methods to increase survival, reduce interactions with wild fish and increase knowledge of the impact of hatchery salmon on wild stocks, and to work with biologists to design and implement experiments. *(\$200,000)*
 - b. Additionally, through a competitive grant program, the Hatchery Scientific Review Group evaluated 42 research projects; thirteen projects were funded. Project selection was based on scientific merit, qualifications of the investigators, ability to provide quantifiable results, and potential to achieve results applicable to hatchery reform goals. The preceding section provides a summary of the thirteen research projects' goals and progress to date. *(\$519,977)*

5. **Long Live the Kings (LLTK)** – is a private, non-profit organization which provides facilitation and staff support to the scientific panel and the co-managers' Hatchery Reform Coordinating Committee. LLTK helps the co-managers and the scientific panel communicate hatchery reform progress to Congress, state legislators, stakeholder groups, and the public. Their mission is to restore wild salmon to the waters of the Pacific Northwest. (\$340,000)
6. **Office of the Interagency Committee (IAC) Administration** – The Office of the IAC with program direction and oversight by the Hatchery Scientific Review Group provides budgetary and fiscal support to the Federal Hatchery Reform Program, including state and federal reporting requirements. (\$47,000)



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